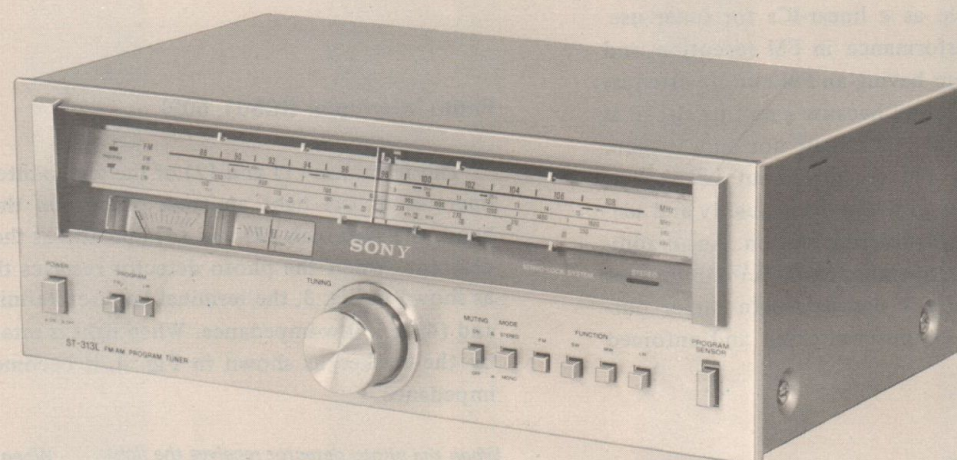


ST-313L

AEP Model
UK Model

FM-AM PROGRAM TUNER

SPECIFICATIONS

GENERAL

System:	FM stereo, FM/AM superheterodyne tuner
Power Requirements:	220 V ac (120 or 240 V ac adjustable), 50 Hz (AEP model) 240 V ac, 50 Hz (UK model)
Power Consumption:	18 W
Dimensions:	Approx. 410 (w) x 145 (h) x 277 (d) mm 16 $\frac{1}{8}$ (w) x 5 $\frac{3}{4}$ (h) x 10 $\frac{7}{8}$ (d) inches including projecting parts and controls
Weight:	Approx. 4.9 kg, 10 lb 13 oz (net) 5.8 kg, 12 lb 13 oz (in shipping carton)

FM TUNER SECTION

Frequency Range:	87.5–108 MHz
Antenna:	300 Ω balanced 75 Ω unbalanced
Intermediate Frequency:	10.7 MHz
Sensitivity at 46 dB Quieting: (40 kHz deviation)	17.3 dBf, 4 μ V (MONO) 39.2 dBf, 50 μ V (STEREO)
Usable Sensitivity:	1.6 μ V, S/N = 26 dB (40 kHz deviation)
S/N Ratio:	75 dB (MONO) 70 dB (STEREO)
Harmonic Distortion: (40 kHz deviation)	at 100 Hz 0.15 % (MONO) 0.25 % (STEREO) at 1 kHz 0.15 % (MONO) 0.25 % (STEREO) at 10 kHz 0.2 % (MONO) 0.5 % (STEREO)

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY

SERVICE MANUAL

— Continued on page 2 —

ST-313L

IM Distortion: (40 kHz deviation)	0.15 % (MONO) 0.25 % (STEREO)
Separation:	35 dB at 100 Hz 45 dB at 1 kHz 35 dB at 10 kHz
Frequency Response:	40 Hz–12.5 kHz $\pm$ 0.5 dB – 1.0 dB
Selectivity:	40 dB at 300 kHz
Capture Ratio:	1.0 dB
AM Suppression Ratio:	54 dB
Image Response Ratio:	45 dB
IF Response Ratio:	90 dB
Spurious Response Ratio:	75 dB
RF Intermodulation:	60 dB
Sub-carrier Product Ratio:	35 dB
Output Level/Impedance:	450 mV, 6.8 k Ω at 1 kHz deviation, 100 % modulation

SW/MW/LW TUNER SECTION

	SW	MW	LW
Frequency Range	5.8–15.8 MHz	530–1,605 kHz	150–350 kHz
Antenna	Attached antenna wire		Built-in ferrite rod antenna
	External antenna terminal		External antenna terminal
Intermediate Frequency	468 kHz		
Usable Sensitivity	30 μ V (29.5 dB), external antenna, at 10 MHz	100 μ V (40 dB), external antenna, at 1,000 kHz	500 μ V/m (54 dB/m), built-in antenna, at 250 kHz 100 μ V (40 dB), external antenna, at 250 kHz
S/N Ratio	52 dB at 5 mV	52 dB at 5 mV	52 dB at 50 mV/m
Harmonic Distortion	0.3 % at 5 mV, 400 Hz		0.3 % at 50 mV/m 400 Hz
Selectivity	28 dB at 9 kHz, 30 dB at 10 kHz		
Image Response Ratio	—	40 dB at 1,000 kHz	65 dB at 250 kHz
IF Response Ratio	—	70 dB at 1,000 kHz	70 dB at 250 kHz

MODEL IDENTIFICATION

— Specification Label —

AEP model

SONY®

FM-AM PROGRAM TUNER

MODEL No. **ST-313L**

FREQ. RANGE:	FM	87.5 – 108 MHz
	SW	5.8 – 15.8 MHz
	MW	530 – 1605 kHz
	LW	150 – 350 kHz
IF:	FM	10.7 MHz
	AM	468 kHz
AC:	220 V ~ 50 Hz	18 W

MADE IN JAPAN

SERIAL NO.

UK model

	FM-AM PROGRAM TUNER	
	MODEL No. ST-313L	
	FREQ. RANGE:	FM 87.5 – 108 MHz SW 5.8 – 15.8 MHz MW 530 – 1605 kHz LW 150 – 350 kHz
	IF:	FM 10.7 MHz AM 468 kHz
	AC	240 V ~ 50 Hz 18 W
	MADE IN JAPAN	
SERIAL NO.		

SECTION 1

OUTLINE

1-1. CIRCUIT DESCRIPTION (See Fig. 1)

Program Sensor

When PROGRAM SENSOR switch (S1) turns on and the pointer matches with a station marker, FM or LW station is automatically selected through optical detection. (Fig. 2).

When the pointer matches only with the FM marker:

- The Light of IC501 (Photo Interrupter) is intercepted by the marker, bias voltage is applied to the base of Q501 through R501, and Q501 is turned on.
- The collector voltage of Q501 reduces and D503 is turned on.
- The terminal (23) of IC201 is grounded through D201, R254, R515, D503, Q501 and D501.
- FM circuit operates (The terminal (23) of IC201 serves as a switch.)

Note: When B+ voltage is applied to the terminal (23) of IC201 through R252, R254 and D201, the receiver is in LW mode. At the same time, as Q503 is on, PL704 (FM indicator lamp) lights. When B+ voltage is not applied, it is in fm mode.

When the pointer matches only with the LW station marker:

- As the light of IC501 is not intercepted, Q501 and D503 are turned off. As a result, B+ voltage is applied to the terminal (23) of IC201 through R252 and R254. On the other hand, the light of IC502 is intercepted by the LW station marker. → Q502 and Q504 are turned on.
- B+ voltage is applied to L253 (LW oscillator coil).
- LW circuit operates. When Q504 is on, PL705 (LW indicator lamp) simultaneously lights.

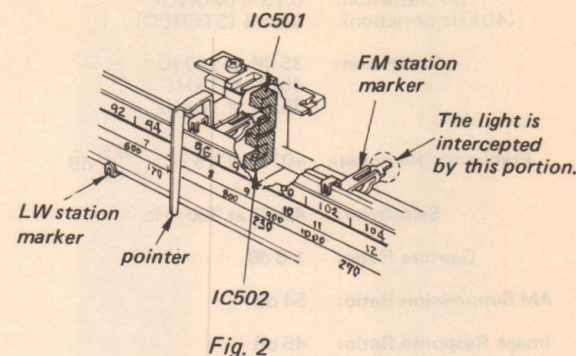


Fig. 2

When the pointer matches simultaneously with both the FM and LW station markers:

Q501 and Q503 are turned on by intercepting the light of IC501. On the other hand, the light of IC502 is also intercepted and the bias voltage is applied to the base of Q502, but because the collector voltage of Q503 is high, D502 is turned off. The emitter voltage of Q502 rises and Q502 is turned off. Therefore, Q504 is turned off and B+ voltage is not applied to L253 (LW oscillator coil) and PL705. Consequently, only the fm station signal is received.

Q505, 506

Q505 operates to improve the rise time of PL704 (FM indicator lamp) and PL705 (LW indicator lamp) when the station signal is tuned, and at the same time Q505 switches Q506. Q505 serves as a high-speed-muting switch which is turned on or off as soon as the station signal is tuned or detuned.

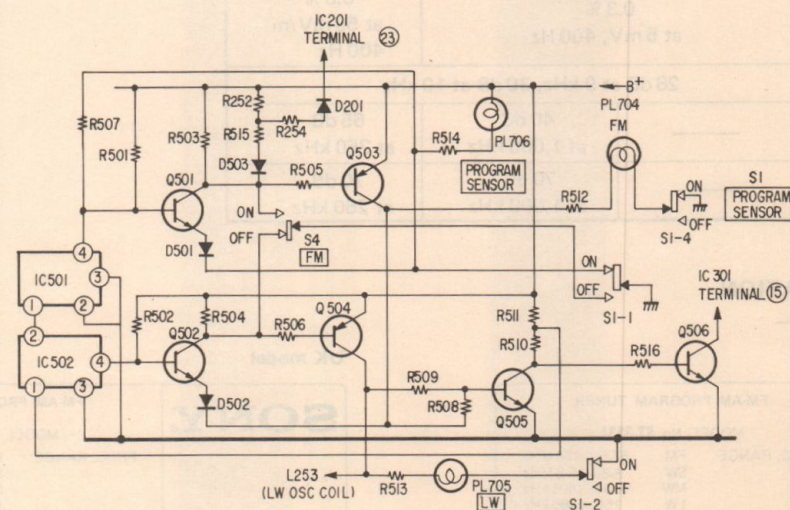


Fig. 1

IC201 (CX168), IC301 (CX178)

These two ICs form a system. Both of them are bipolar-linear-ICs. CX168 integrates 343 elements and CX178 integrates 260 elements. They include many functions and are improved upon the degree of integration now available as a linear-ICs for tuner use. They have high performance in FM reception and form a muting system having an FM muting attenuation of 90dB. In addition, because a muting circuit is newly employed in the AM circuit not only is there high performance in FM reception but LW station signal can be received with fine tone quality and sensitivity as with FM broadcasting station. As an additional function, they operate for FM/LW continuous station selection, FM/LW signal-strength meter output, FM/LW muting output switching and enforced AGC at FM reception.

CX168 Main Function

<FM>

- IF Amplifier
- Quadrature detector
- Signal-strength Meter Output
- Muting Signal Output
- AFC Output for Converter
- Multipath Signal Output
- Bandpass Control Circuit

<AM>

- RF Attenuator
- Mixer
- Oscillator
- IF Amplifier and AGC
- AM Detector
- Signal-strength Meter Output
- Signal Generator for AM Muting

<General>

- Regulator
- FM/AM Switching
- Regulator Output

CX178 Main Function

<FM Stereo Demodulator>

- FM Stereo Demodulator
- Phase Detector
- Stereo Indicating Circuit
- VCO
- VCO ON/OFF Circuit

<General>

- Muting Gate
- Regulator
- Muting Canceler Circuit
- Pop-noise Canceler
- Hysteresis Circuit

Photo Interrupter (IC501, 502)

The terminals (1) and (2) of the photo interrupter operates as the light emitting diode. On the other hand, the terminals (3) and (4) operates as the photo detector. When the photo detector receives the light as shown in Fig. 3, the terminal between terminals (3) and (4) is a low-impedance. When light is intercepted by the marker, as shown in Fig. 4, it becomes high-impedance.

When the photo detector receives the light:

When light is intercepted by the marker:

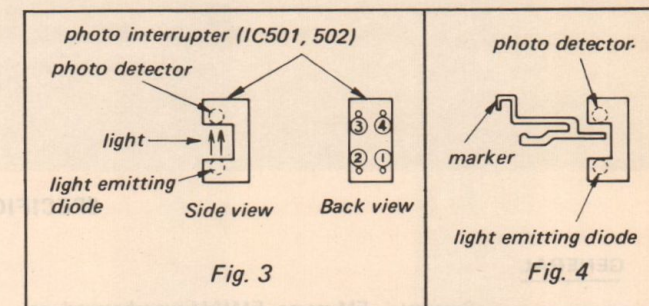
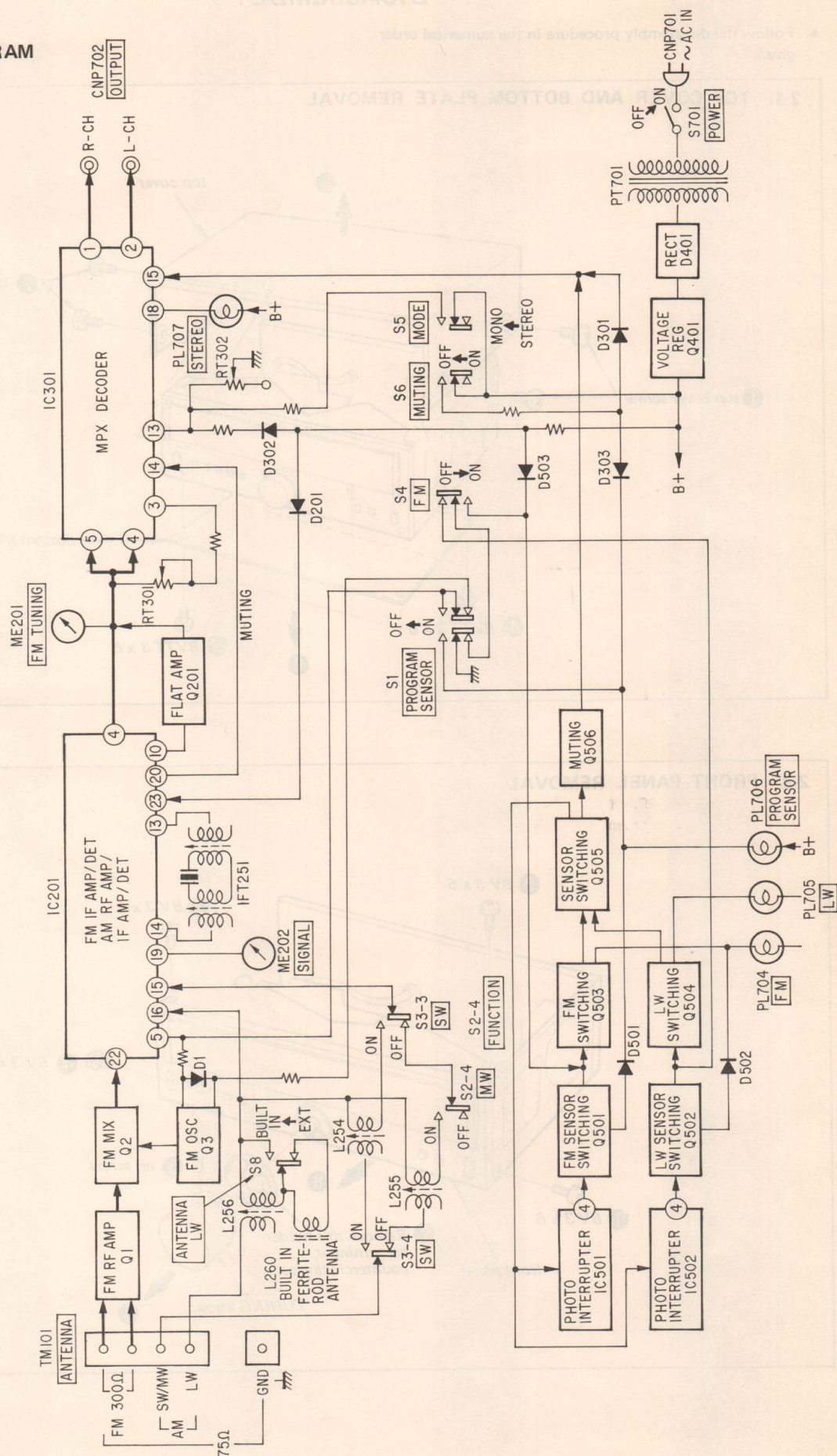


Fig. 3

Fig. 4

1-2. BLOCK DIAGRAM

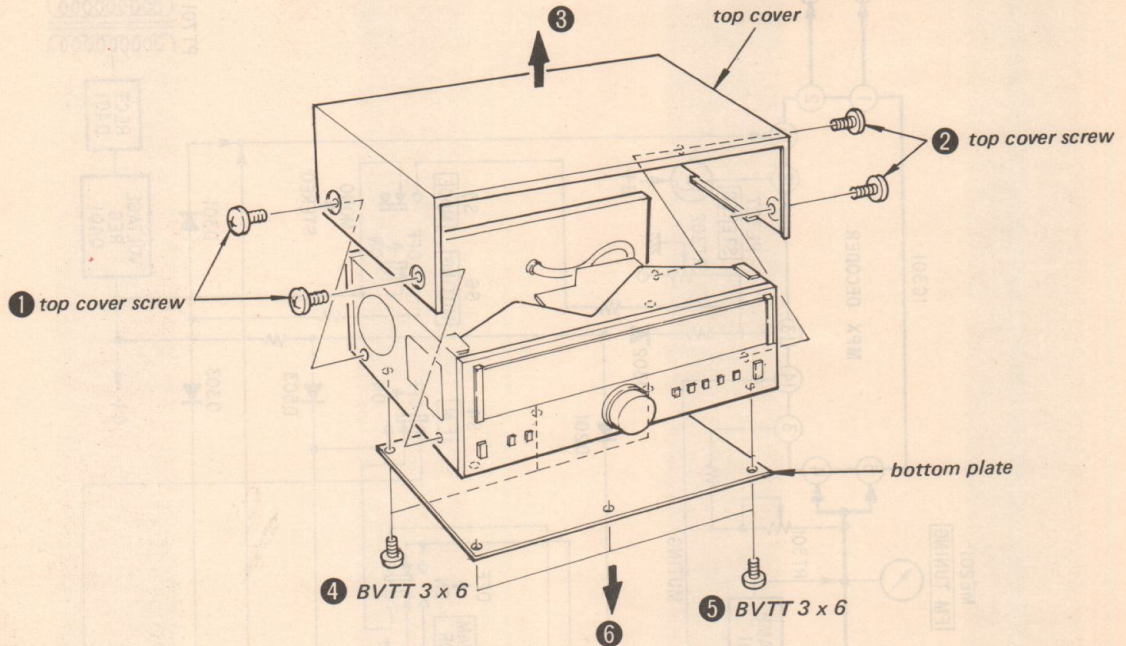


SECTION 2

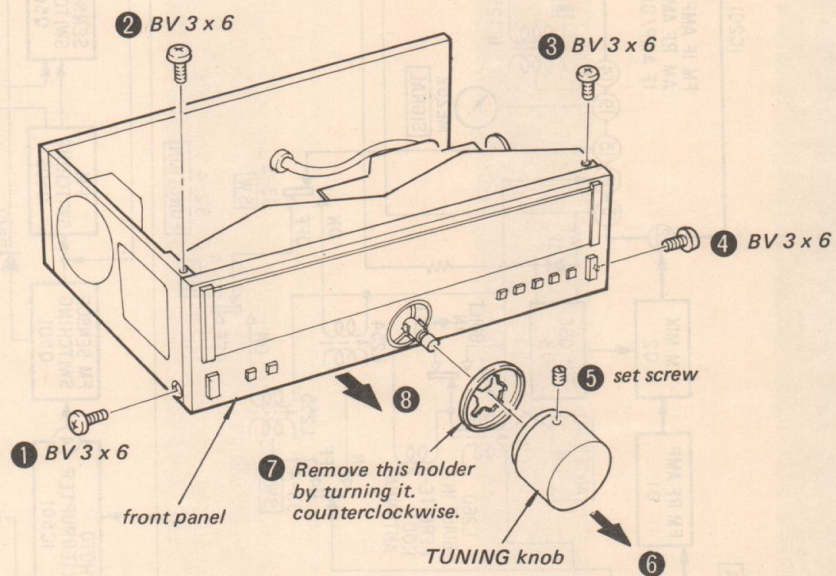
DISASSEMBLY

- Follow the disassembly procedure in the numerical order given.

2-1. TOP COVER AND BOTTOM PLATE REMOVAL

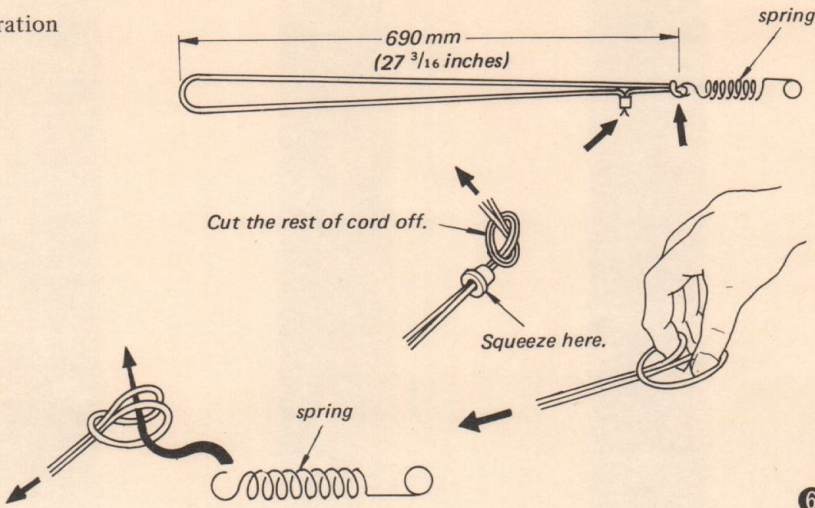


2-2. FRONT PANEL REMOVAL



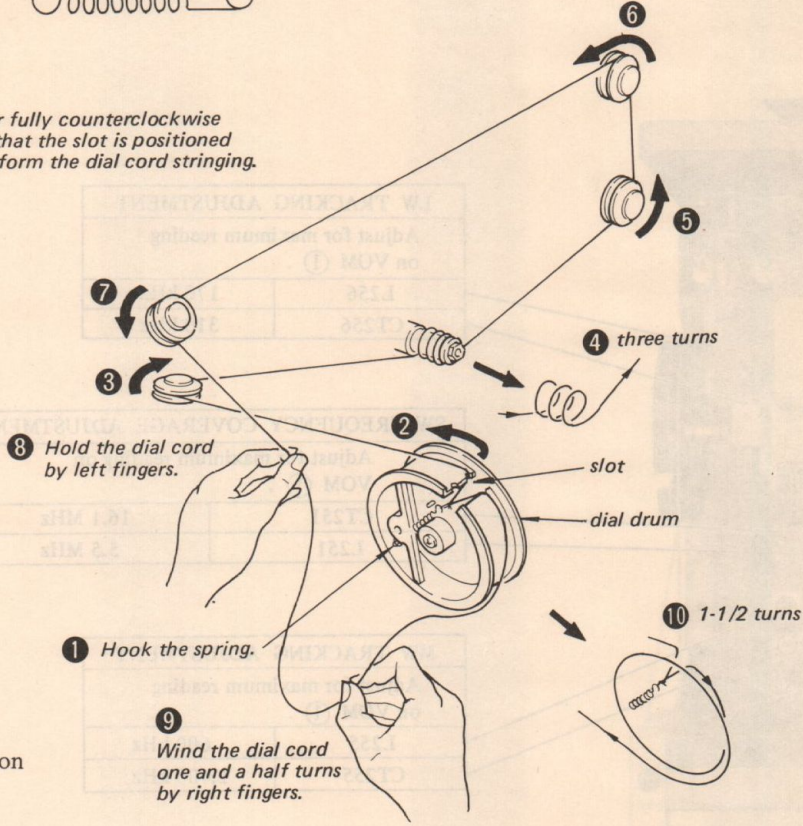
2-3. DIAL CORD STRINGING

1) Preparation

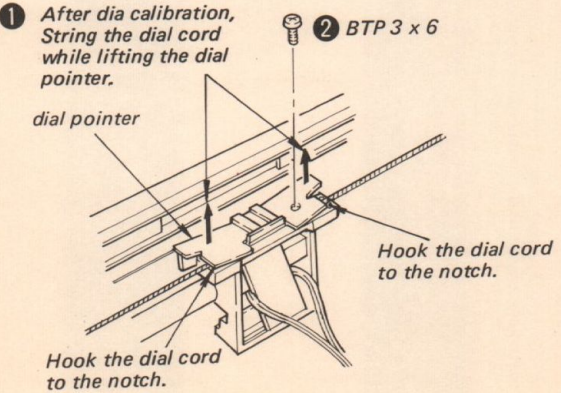


2) Stringing

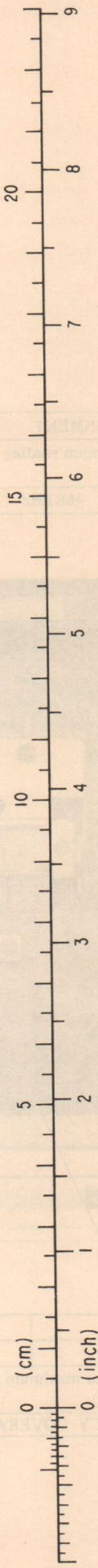
Turn the tuning capacitor fully counterclockwise and set the dial drum so that the slot is positioned to the upper side and perform the dial cord stringing.



3) Dial Pointer Installation



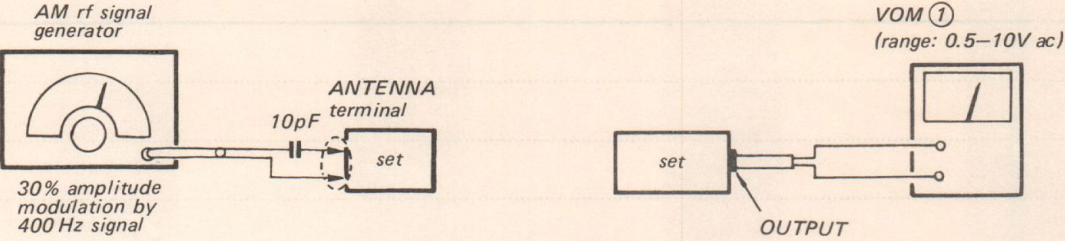
MEMO



SECTION 3

ADJUSTMENTS

3-1. AM SECTION



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

LW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM ① .	
145 kHz	L253
365 kHz	CT253

SW TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM ① .	
15 MHz	CT254
6 MHz	L254

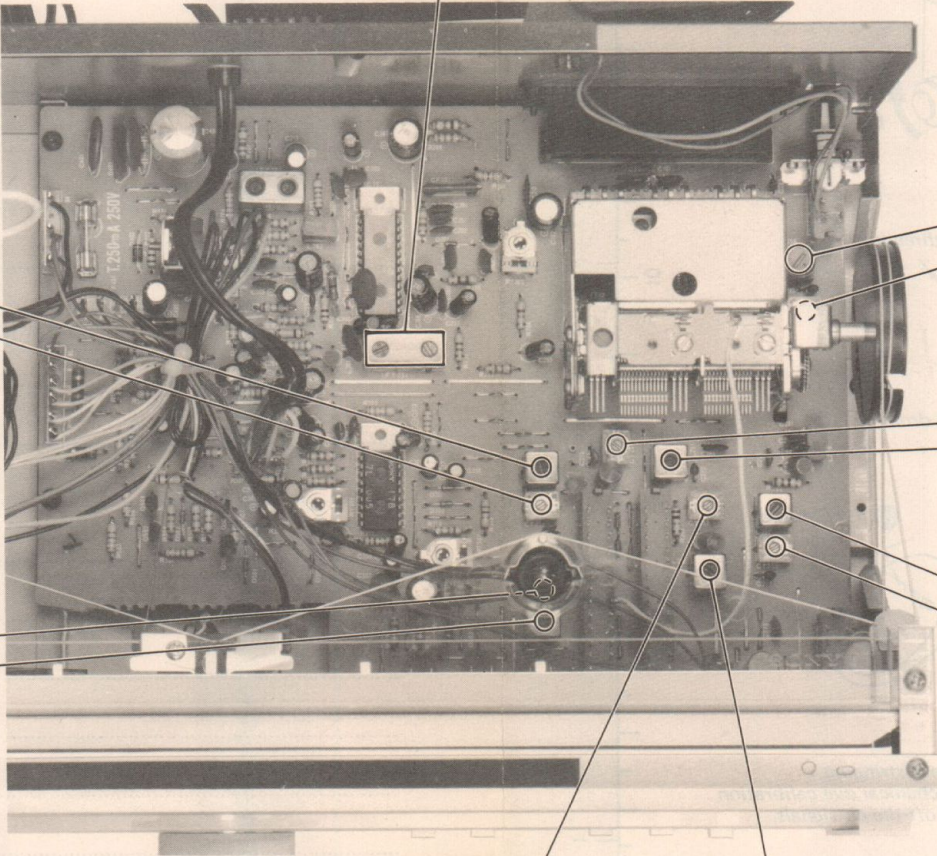
AM IF ALIGNMENT	
Adjust for maximum reading on VOM ① .	
IFT251	468 kHz

LW TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM ① .	
L256	170 kHz
CT256	310 kHz

SW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM ① .	
CT251	16.1 MHz
L251	5.5 MHz

MW TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM ① .	
L255	600 kHz
CT255	1,400 kHz

CT252	L252
1,680 kHz	520 kHz
Adjust for maximum reading on VOM ① .	
MW FREQUENCY COVERAGE ADJUSTMENT	



3-2. FM SECTION

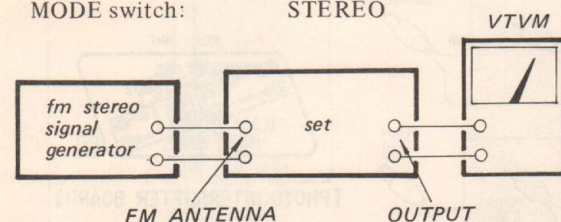
FM Frequency Coverage and Tracking Adjustment

Never attempt alignment of the fm front-end section for the fm frequency coverage and tracking adjustments. If the fm frequency coverage and tracking adjustments are required, consult the factory service center.

FM Stereo Separation Adjustment

Setup:

FUNCTION selector: FM
MODE switch: STEREO



FM Stereo Signal Generator Setting:

Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Mode: Stereo
Modulation:
Audio (400 Hz): 67.5 kHz deviation (90 %)
Pilot (19 kHz): 7.5 kHz deviation (10 %)
Sub channel (38 kHz): 67.5 kHz deviation (90 %)

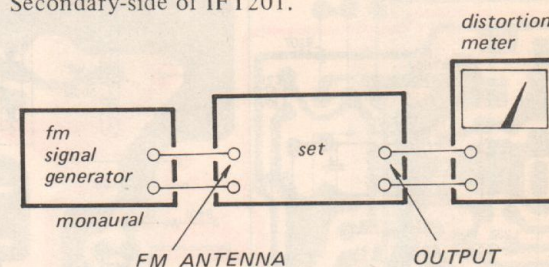
FM stereo signal generator output channel	VTVM connection	VTVM reading
L-CH	L-CH	(A)
		(B)
R-CH	L-CH	Adjust RT301 for minimum reading.
R-CH	R-CH	(C)
		(D)
L-CH	R-CH	Adjust RT301 for minimum reading.

Readjust RT301 for minimum difference between left channel separation ((A) - (B)) and right channel separation ((C) - (D)).

Discriminator Alignment

Procedure:

1. Secondary-side of IFT201.



FM Signal Generator Setting:

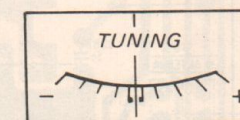
Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100 %)
Output level: 1 mV (60 dB)

Procedure:

Tune the set to 98 MHz and adjust the secondary-side core (black) of IFT201 for minimum reading on the distortion meter.

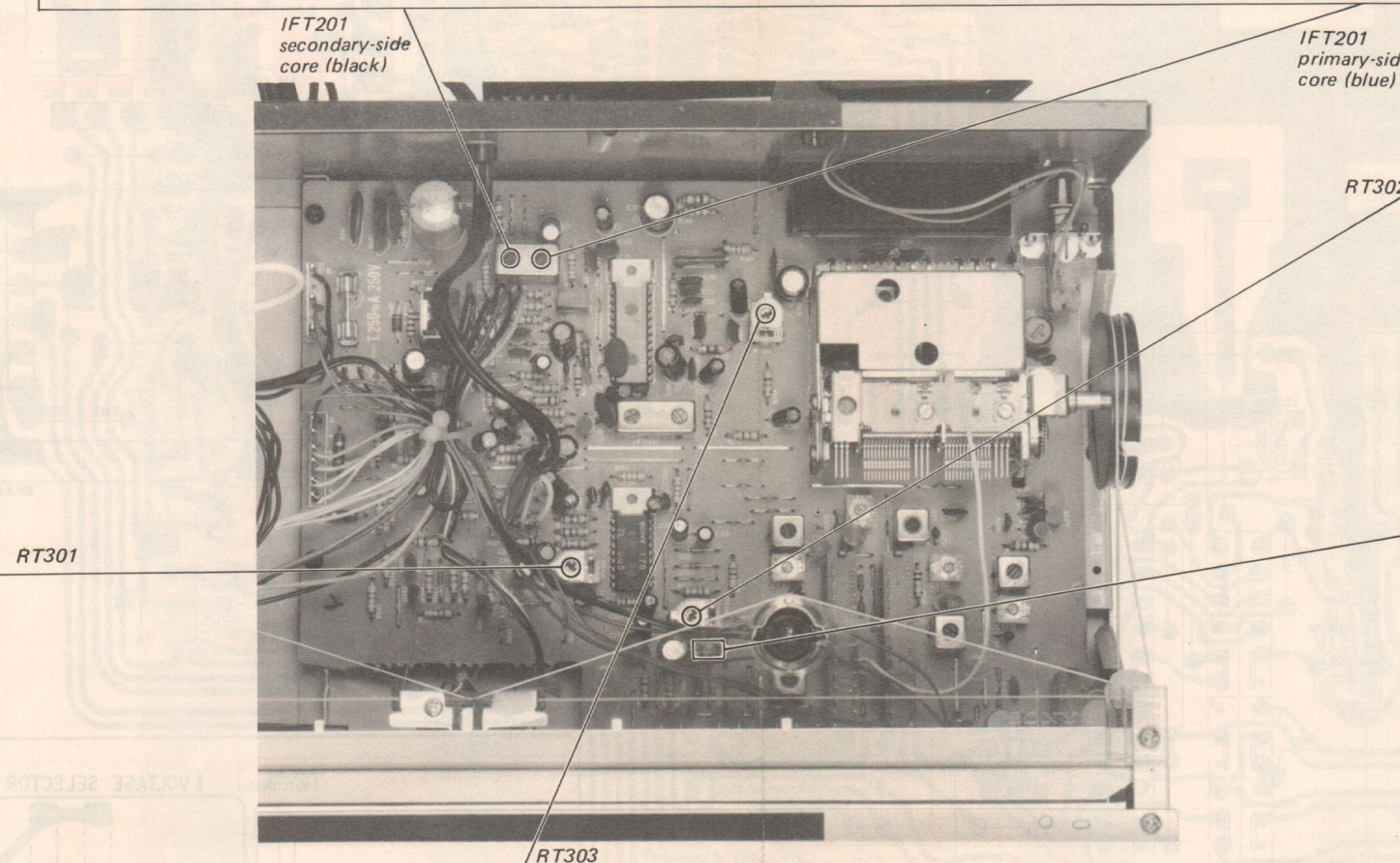
2. Primary-side of IFT201

- 1) Detune the set.
- 2) Adjust the primary-side core (blue) of IFT201 for zero center on the TUNING meter.



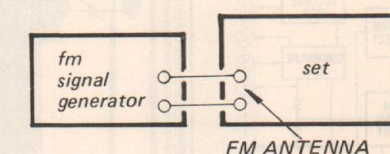
(Perform this procedure when replacing ceramic filter (CF201).)

3. Repeat the above steps 1 and 2 several times.



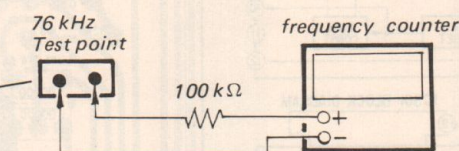
VCO(76kHz) Adjustment

A) Regular Method



FM Signal Generator Setting:

Carrier frequency: 98 MHz
Modulation: no modulation
Output level: 1 mV (60 dB)



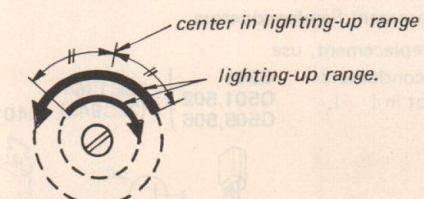
Procedure:

1. Tune the set to 98 MHz
2. Adjust RT302 for 76 kHz $\pm$ 100 Hz on the counter.

B) Simple Method

Procedure:

1. Tune the set to the FM stereo station signal.
2. Turn RT302 clockwise or counterclockwise and memorize the lighting-up range of STEREO lamp.
3. Secure RT302 at the center in lighting-up range of both turns as shown below.

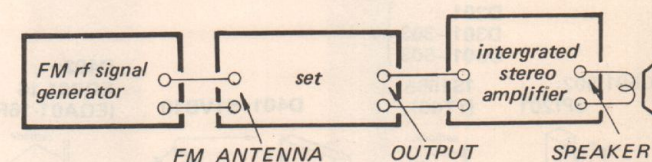


Muting Level Adjustment

Setting:

FUNCTION selector: FM
MUTING switch: ON

Procedure:



FM Signal Generator Setting:

Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100 %)

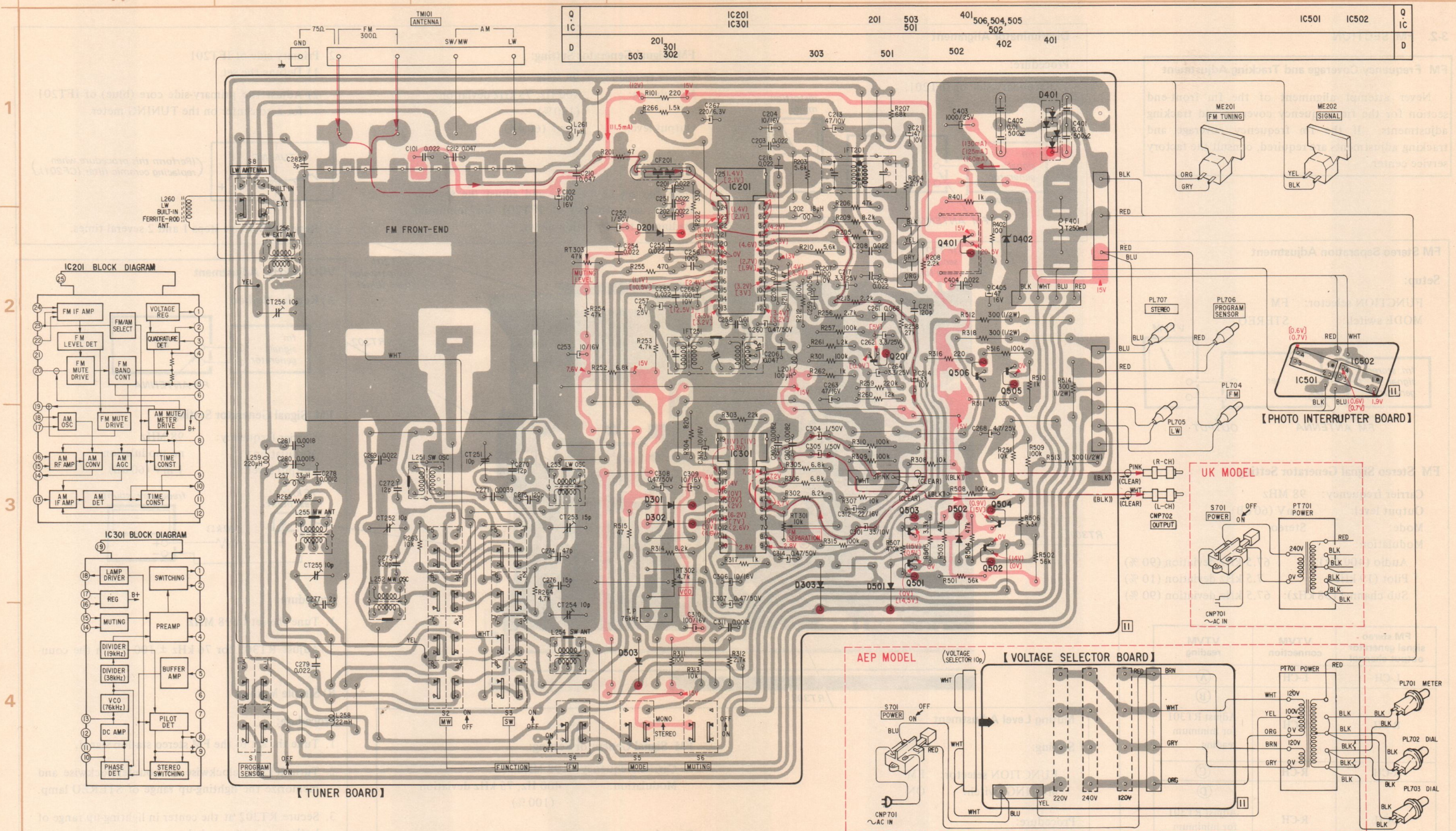
Procedure:

1. Set the output level of the fm signal generator to 6.3 μ V (16 dB).
2. Adjust RT303 for the point where the sound can not be audible.

SECTION 4 DIAGRAMS

ST-31 3L ST-31 3L

4-1. MOUNTING DIAGRAM



Replacement Semiconductors

For replacement, use semiconductors except in ().

Q201: 2SC1364
Q501, 502: (2SC945)
Q505, 506: (2SC945)
Q401: 2SC1173

Q503, 504: 2SA678

(2SA844)

IC201: CX168

IC301: CX178

D201: 1S1555 (1T40)
D301-303: 1S1555 (1T40)
D501-503: 1S1555 (1T40)

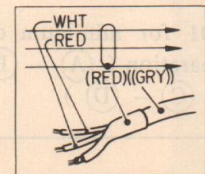
D401: S1VB10

D402: EQB01-16 (EQA01-16R)

Note:

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.
- : indicates side identified with part number.

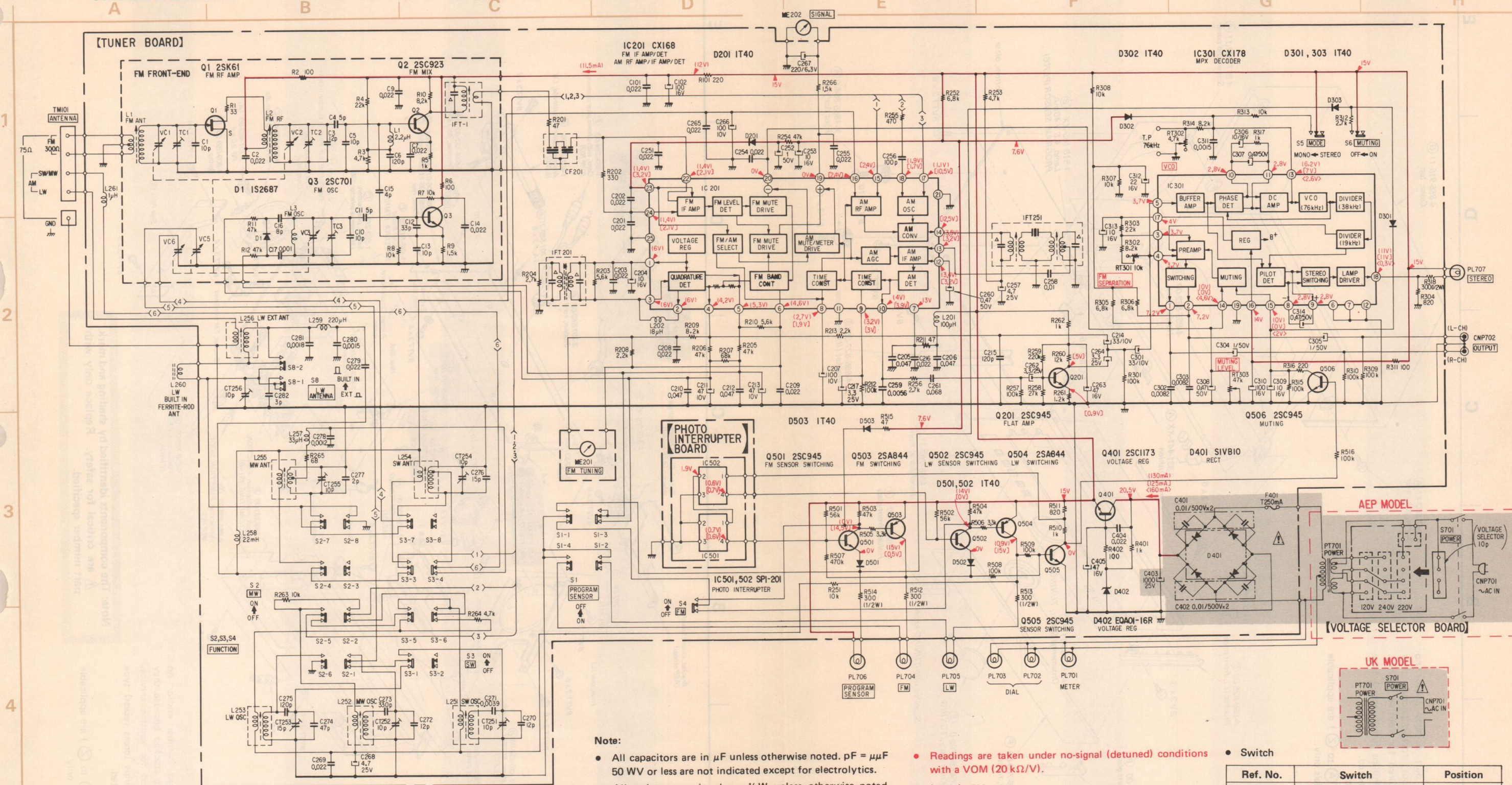
- Color code of sleeving over the end of the jacket.



- : B + pattern
- : Signal Path
- : FM
- : L-CH
- : R-CH

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

4-2. SCHEMATIC DIAGRAM



Note:

- All capacitors are in μF unless otherwise noted. $\text{pF} = \mu\text{F} / 100$
- 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, $\frac{1}{4} \text{ W}$ unless otherwise noted.
 $\text{k}\Omega = 1000 \Omega$; $\text{M}\Omega = 1000 \text{k}\Omega$
- $\triangle$: internal component.
- : panel designation.
- : adjustment for repair.
- : B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.

- Readings are taken under no-signal (detuned) conditions with a VOM (20 k Ω /V).
- (): FM
 []: AM
 < >: FM stereo
 nomark: common

- Switch

Ref. No.	Switch	Position
S1	PROGRAM SENSOR	ON
S2	FUNCTION-MW	OFF
S3	FUNCTION-SW	OFF
S4	FUNCTION-FM	OFF
S5	MODE	STEREO
S6	MUTING	ON
S8	LW ANTENNA	EXT
S701	POWER	OFF

SECTION 5



Note:

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head
- Circled letters (**A** to **Z**) are applicable to European models only.

3



- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head
- Circled letters (**A**) to (**Z**) are applicable to European models only.

Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

SECTION 6
ELECTRICAL PARTS LIST

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No. Part No. Description

SEMICONDUCTORS

Transistors

⇒ Q201 8-729-663-47 (B) 2SC1364
Q401 8-729-217-33 (C) 2SC1173
⇒ Q501, 502 8-729-663-47 (B) 2SC1364
⇒ Q503, 504 8-727-788-00 (B) 2SA678
⇒ Q505, 506 8-729-663-47 (B) 2SC1364

ICs

IC201 8-751-680-01 (I) CX168
IC301 8-751-780-00 (G) CX178
IC501, 502 8-719-902-01 (D) SPI201

Diodes

⇒ D201 8-719-815-55 (B) 1S1555
⇒ D301-303 8-719-815-55 (B) 1S1555
D401 8-719-511-10 (C) S1VB10
⇒ D402 8-719-931-16 (B) EQB01-16
⇒ D501-503 8-719-815-55 (B) 1S1555

COILS

L201 1-407-169-XX (A) 100 μ H, microinductor
L202 1-407-741-00 (B) 18 μ H, microinductor
L251 1-405-812-00 (B) SW Osc
L252 1-405-797-00 (B) MW Osc
L253 1-405-813-00 (B) LW Osc

L254 1-401-741-00 (B) SW Ant
L255 1-401-728-00 (B) MW Ant
L256 1-401-709-00 (C) LW EXT Ant
L257 1-407-163-XX (A) 33 μ H, microinductor
L258 1-407-210-XX (A) 22 mH, microinductor

L260 1-401-747-00 (F) Antenna, built-in ferrite-rod; LW
L261 1-407-178-XX (A) 1 μ H, microinductor

TRANSFORMERS

IFT201 1-404-011-00 (C) FM discriminator
IFT251 1-404-087-00 (D) AM IFT
PT701 1-446-118-00 (G) Power (AEP model) *europ.*
PT701 1-446-119-00 (G) Power (UK model) *engels.*

Ref. No. Part No. Description

CAPACITORS

All capacitors are in μ F and ceramic unless otherwise noted.
50 WV or less are not indicated except for electrolytics.
pF = μ F, elect = electrolytic

C101 1-101-005-11 (A) 0.022
C102 1-121-415-11 (A) 100 16 V elect

C201-203 1-101-005-11 (A) 0.022
C204 1-121-651-11 (A) 10 16 V elect
C205 1-101-006-11 (A) 0.047
C206 1-101-925-11 (A) 0.047
C207 1-121-414-11 (A) 100 10 V elect

C208, 209 1-101-005-11 (A) 0.022
C210 1-101-925-11 (A) 0.047
C211 1-121-352-11 (A) 47 10 V elect
C212 1-101-925-11 (A) 0.047
C213 1-121-352-11 (A) 47 10 V elect

C214 1-121-403-11 (A) 33 10 V elect
C215 1-102-816-11 (A) 120 p
C216 1-101-005-11 (A) 0.022
C217 1-121-392-11 (A) 3.3 25 V elect
C251 1-101-005-11 (A) 0.022

C252 1-121-391-11 (A) 1 50 V elect
C253 1-121-416-11 (B) 10 16 V elect
C254, 255 1-101-005-11 (A) 0.022
C256 1-102-973-11 (A) 100 p
C257 1-121-395-11 (A) 4.7 25 V elect

C258 1-101-044-11 (A) 0.01
C259 1-108-355-12 (A) 0.0056 mylar
C260 1-121-726-11 (A) 0.47 50 V elect
C261 1-108-249-12 (A) 0.068 mylar
C262 1-121-392-11 (A) 3.3 25 V elect

C263 1-121-409-11 (A) 47 16 V elect
C264 1-121-392-11 (A) 3.3 25 V elect
C265 1-101-005-11 (A) 0.022
C266 1-121-414-11 (A) 100 10 V elect
C267 1-121-419-11 (A) 220 6.3 V elect

C268 1-121-395-11 (A) 4.7 25 V elect

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

⇒ Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note:
• Items with no part number and/or no description are not stocked because they are seldom required for routine service.
• All screws are Phillips (cross recess) type unless otherwise noted.
• (—) = slotted head
• Circled letters (A to Z) are applicable to European models only.

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
C269	1-101-005-11 (A) 0.022	
C270	1-102-262-11 (A) 12 p	
C271	1-103-739-11 (A) 0.0039	polystyrol
C272	1-102-749-11 (A) 12 p	
C273	1-103-713-11 (A) 330 p	polystyrol
C274	1-101-880-11 (A) 47 p	
C275	1-103-703-11 (A) 120 p	polystyrol
C276	1-102-951-11 (A) 15 p	
C277	1-102-935-11 (A) 2 p	
C278	1-102-118-11 (A) 0.0012	
C279	1-101-005-11 (A) 0.022	
C280	1-108-228-12 (A) 0.0015	mylar
C281	1-108-352-12 (A) 0.0018	mylar
C282	1-102-936-11 (A) 3 p	
C301	1-121-403-11 (A) 33	10 V elect
C302, 303	1-108-356-12 (A) 0.0022	mylar
C304, 305	1-121-391-11 (A) 1	50 V elect
C306	1-121-651-11 (A) 10	16 V elect
C307, 308	1-121-726-11 (A) 0.47	50 V elect
C309	1-121-651-11 (A) 10	16 V elect
C310	1-121-415-11 (A) 100	16 V elect
C311	1-104-081-11 (A) 0.0015	polystyrol
C312	1-121-479-11 (A) 22	16 V elect
C313	1-121-651-11 (A) 10	16 V elect
C314	1-121-726-11 (A) 0.47	50 V elect
C401, 402	(A) 1-102-355-11 (A) 0.01x2	500 V
C403	(A) 1-121-388-11 (B) 1000	25 V elect
C404	1-101-005-11 (A) 0.022	
C405	1-121-409-11 (A) 47	16 V elect
CT251-256	1-141-179-12 (B) 10 p,	trimmer
CT253	1-141-171-00 (A) 15 p,	trimmer

RESISTORS

All resistors are in ohms. Common ¼ W carbon resistors are omitted. Refer to the list on page 22 for the their part numbers. kΩ = 1000 Ω, MΩ = 1000 kΩ.

R318) 1-244-860-11 (A) 300 ½ W composition
RS12-514

Ref. No.	Part No.	Description
RT301	1-224-645-XX (B) 10 k-B,	adjustable; FM separation
RT302	1-224-644-XX (B) 4.7 k-B,	adjustable; VCO
RT303	1-224-647-XX (B) 47 k-B,	adjustable; muting level

SWITCHES

S1-6	1-552-583-00 (B) Pushbutton, FUNCTION/MODE/	MUTING
S8	1-552-233-00 (C) Pushbutton, LW antenna selector	
S701	(A) 1-552-584-00 (D) Pushbutton, POWER	

MISCELLANEOUS

CF201	1-527-277-91 (G) Filter, ceramic	
CNP701	(A) 1-534-777-00 (D) Cord, power (UK model)	
CNP701	(A) 1-534-817-XX (D) Cord, power (AEP model)	
CNP702	1-551-294-00 (E) Cord, with phono plug connection	
F401	(A) 1-532-273-00 (B) Fuse, T250 mA	
ME201	1-520-339-00 (H) Meter, FM TUNING	
ME202	1-520-338-00 (H) Meter, SIGNAL strength	
PL701	1-518-297-00 (C) Lamp, 8 V 300 mA; meter	
PL702, 703	1-518-317-00 (G) Lamp, dial; with reflection plate	
PL704	1-518-169-XX (B) Lamp, 4.5 V 40 mA; FM	
PL705	1-518-169-XX (B) Lamp, 4.5 V 40 mA; LW	
PL706	1-518-169-XX (B) Lamp, 4.5 V 40 mA; PROGRAM	
	SENSOR	
PL707	1-518-169-XX (B) Lamp, 4.5 V 40 mA; STEREO	
TM101	1-536-542-00 (C) Terminal Board, ANTENNA	

1-463-248-00 (M) FM Front-end

(A) 1-535-131-00 (A) Holder, fuse

1-535-132-00 (B) Terminal, ANTENNA ground

ACCESSORIES & PACKING MATERIALS

Part No.	Description
1-501-184-00	(C) Feeder Antenna
3-701-630-00	(A) Bag, plastic (UK model)
3-770-582-11	(C) Manual, instruction
4-855-829-00	(B) Cushion
4-856-760-01	(D) Carton

Note: The components identified by shading and mark (A) are critical for safety. Replace only with part number specified.

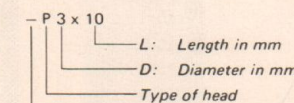
1/4 WATT CARBON RESISTORS (A)

Note: Circled letter (A) is applicable to European models only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-727-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11		

HARDWARE NOMENCLATURE

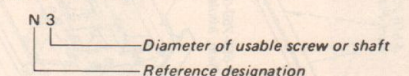
Screw:



Indicated slotted-head only.

Unless otherwise indicated, it means cross-recessed head (Phillips type).

Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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